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# Production Cost and Return; Comparative Analysis of Sorghum in India and Nigeria

**Jimjel Zalkuwi<sup>1</sup>, Rakesh Singh<sup>1</sup>, Madhusudan Bhattarai<sup>2</sup>, O. P. Singh<sup>1</sup>, B. Dayakar<sup>3</sup>**<sup>1</sup>Department of Agricultural Economics, Institute of Agricultural science, BHU, Varanasi, India<sup>2</sup>Department of Agricultural Economics, ICRISAT India<sup>3</sup>Department of Agricultural Economics, DSR India

### Email address:

jzalkuwi4u@gmail.com (J. Zalkuwi)

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**Abstract:** This study analyzed and compared the cost and return of sorghum production in India and Nigeria. Data were collected through the administration of 480 copies of questionnaires to selected sorghum farmers (240 from each country) using simple random sampling techniques. The result of the CACP cost concept reveal that average outputs of the respondents 17.68 qtls and 18.14 qtls per hectare for India and Nigeria sorghum production systems respectively. Also, the revenue generated were Rs. 17354.30 and Rs. 20642.10 per hectare for India and Nigeria sorghum production respectively. The results reveal that India sorghum production had a gross margin and net farm income of Rs. 28281.90 and 17354.30 per hectare respectively while Nigeria sorghum producer had a gross margin and net farm income of Rs. 29810.00 and Rs 20642.10 per hectare respectively. The study therefore revealed that, the business of cultivating sorghum in Nigeria is more profitable than that of India.

**Keywords:** Cost, Return, Sorghum, India and Nigeria

## 1. Introduction

Sorghum has a variety of uses including food for human consumption, feed grain for livestock and industrial applications such as beer, syrup and ethanol production. Currently, most human consumption of sorghum occurs in low-income countries like India and Nigeria, while high-income countries like U.S and Mexico typically use sorghum as a component in livestock feed and to produce ethanol. India contributes about 16% of the world's sorghum production. It is the fourth most important cereal crop in the country after rice, wheat and maize. In India, this crop was one of the major cereal staples during 1950's and occupied an area of more than 18 million hectares then decreased in 1981 to 16million ha, and 5.0 million hectares in 2014 (TE 2014). Nigeria is the largest producer of sorghum in West Africa accounting for about 71% of the total regional sorghum output. Sorghum is the third cereal in terms of quantity of production in Nigeria. Production declined since 2014 due to the strong reduction of both area harvested and yields. Looking at the production of these countries we can observe that there is a decrease in production area, this

therefore prompts the need for the study on the cost and return to the enterprise so as to ascertain its viability among the producing countries.

## 2. Methodology

Comparison between two countries was based on primary data received from ICRISAT, India, ICRISAT India office collected primary data from the farmers from Maharashtra .The data pertained to the 2013 cropping season, primary data from farmers were collected from Adamawa, Nigeria which also pertained to 2013 cropping season. Secondary data were collected from publications and ministry of Agriculture, India. Where by 240 sorghum farmers were extracted from a penal data for the study while Primary data was collected directly from 240 sorghum farmers from Nigeria. The main instrument that was used for collecting the data was structured schedule. Simple random sampling and purposive sampling techniques were used at various stages as the selection procedures in the selection of

240 respondents.

### 3. Analytical Tools

CACP Cost Concept

Cost A1 = All variable costs excluding family labour cost and including land revenue, depreciation and interest on working capital.

Cost A2 = Cost A1 + Rent paid for leased-in land.

Cost B1 = Cost A1 + Interest on the value of owned fixed capital assets (excluding land).

Cost B2 = Cost B1 + Rental value of owned land (Net of land revenue).

Cost C1 = Cost B1 + Imputed value of family labour.

Cost C2 = Cost B2 + Imputed value of family labour.

Cost C2\* = Cost C2 estimated by taking into account statutory minimum or actual wage rate, whichever is higher.

Cost D = Cost C\*2 + 10 per cent of cost C2 \* on account of managerial function

Performed by the farmers.

### 4. Result and Discussions

The distribution of cost and return per hectare in Sorghum production in India and Nigeria are presented in table 1

**Table 1.** Comparison of cost and return of Sorghum production in India and Nigeria.

Particulars	Sorghum in India	Sorghum % in India	Sorghum in Nigeria	Sorghum % in Nigeria
Operational Costs				
Seed	1810.09	7.06	1502.83	5.23
Fertilizer	3716.00	14.50	5903.76	20.54
Human Labour	2212.11	8.63	2541.76	8.84
Machine Labour	3490.13	13.62	4321.14	15.04
Chemicals	1538.00	6.00	2322.08	8.08
Transportation	1005.00	3.92	1816.47	6.32
Storage	134.98	0.53	258.00	0.89
Tractor	790.09	3.08	904.00	3.15
Sub Total	14696.40	57.35	19570.04	68.10
Fixed Cost				
Depreciation	123.00	0.48	98.74	0.34
Rent paid for leased	1808.77	7.06	1306.00	4.54
Rent value of owned land	6600.36	25.76	5100.30	17.74
Interest on Owned land	66.02	0.25	51.00	0.18
Sub total	8598.15	33.55	6556.04	22.81
10% of managerial of Sub total	2329.40	9.10	2612.6	9.10
Grand Total	25624.05	100	28738.64	100

#### 4.1. Per Hectare of Cost Sorghum Production in India and Nigeria

The table revealed that, the average total cost of production per hectare was Rs.25624.05 and Rs.28738.64 out of which Rs.14696.04 and Rs.19570.04 were operational costs accounting for 57.35 and 68.10% of the total cost for Indian and Nigerian sorghum production respectively. This was largely attributed to the high cost of labour accounting for 22.25 and 23.88% of the total cost in the study area and having converted family labour to cost at prevailing market price rate. This finding is in consonance with Ohajianya's (2003), Daniel 2011, Zalkuwi et al (2010, 2013, 2014), Agarwal et al (2014) who reported that labour cost is a major component of the total cost. The second highest operational cost was fertilizer accounting for 14.50 and 20.54% for India and Nigeria respectively. The fixed costs were Rs.8598.15 and Rs.6556.04 which accounted for 33.55 % and 22.81 % of the total cost for Indian and Nigerian sorghum production respectively. From the above table we can see that the operational cost was higher in Nigerian Sorghum producers than Indian Sorghum producer while the fixed cost was higher in Indian sorghum producers.

#### 4.2. Show the Share of Different Cost in Sorghum Production in India and Nigeria

If we examine the pattern of expenditure we can see that in India fixed cost has the highest cost followed by material input and then labour while in Nigeria material input ranks first followed by labour cost and then fixed cost

**Table 2.** Show the Share of different cost in Sorghum production system.

S/No	Show the Cost	Percentage in India	Percentage in Nigeria
1	Fixed Cost	36.91	25.09
2	Labour	24.48	26.26
3	Material Input	30.32	37.24
4	Others	8.29	11.40
	Total	100	100

From the table 2 we can observe wide variation in fixed cost between India and Nigeria. This was attributed to the high cost of rent on leased land and also the rent value of owned land in India that is an indication of land is more expensive in India than in Nigeria.

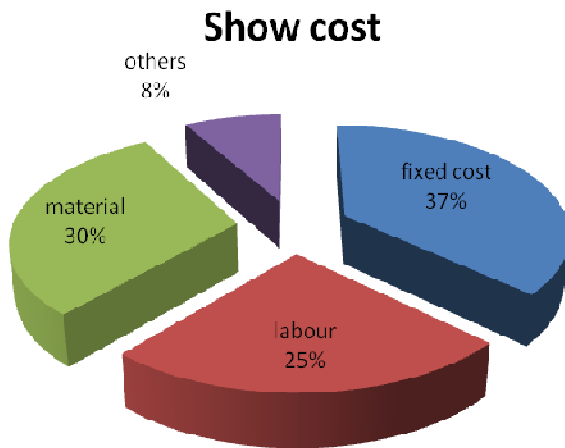


Fig. 1. Show the share of different cost in Sorghum production in India.

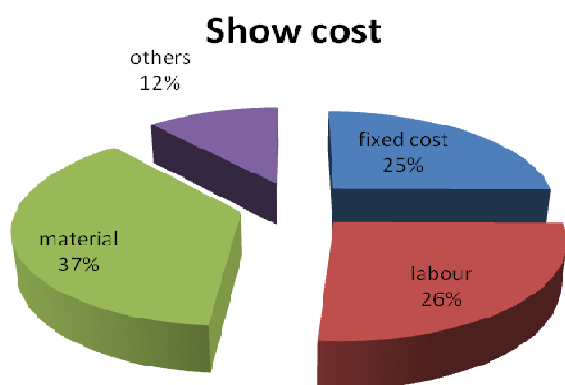


Fig. 2. Show the share of different cost in Sorghum production in Nigeria.

Table 3. Cost Concept in Sorghum Production System.

Cost concept	Total Cost in India	Total Cost in Nigeria
Cost A <sub>1</sub>	14819.40	19668.78
Cost A <sub>2</sub>	16628.17	20974.78
Cost B <sub>1</sub>	16694.19	21025.78
Cost B <sub>2</sub>	23294.55	26126.08
Cost C <sub>1</sub>	18906.30	23567.54
Cost C <sub>2</sub>	25506.66	28667.76
Cost C <sub>2</sub> *	23294.55	26126.04
Cost D	25624.05	28738.64
Yield of main product(q/ha)	17.68	18.14
Yield of by – product(q/ha)	12.11	11.96
Price of main product(Rs/q)	1848.14	2181.30
Price of by-product(Rs/q)	850.80	820.34
Return from main product (Rs/ha)	32675.10	39568.80
Return from by-product (Rs/ha)	10303.20	9811.30
Gross return (Rs)	42978.3	49,380.10
Gross Margin	28,281.90	29810.10
Net Income	17,354.30	20642.10
Cost of production at cost D (Rs./Qt)	17,354.30	20642.10
B-C Ratio	1.7	1.7

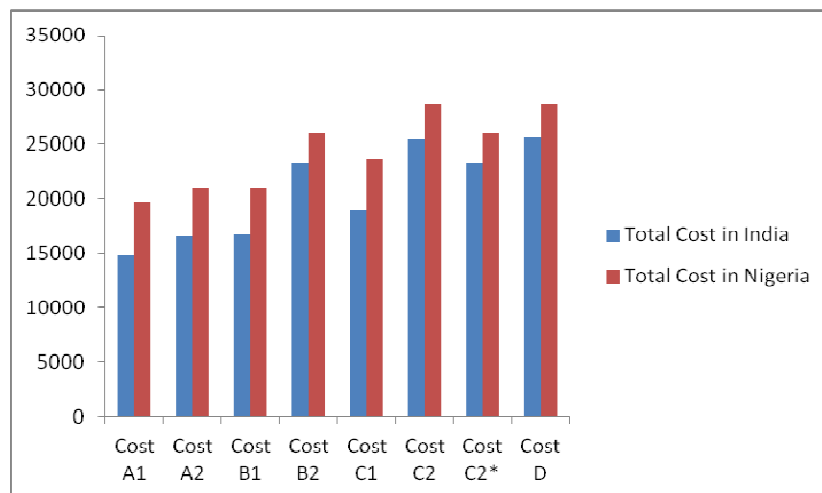


Fig. 3. Comparison of cost A1 to D for Sorghum production in India and Nigeria.

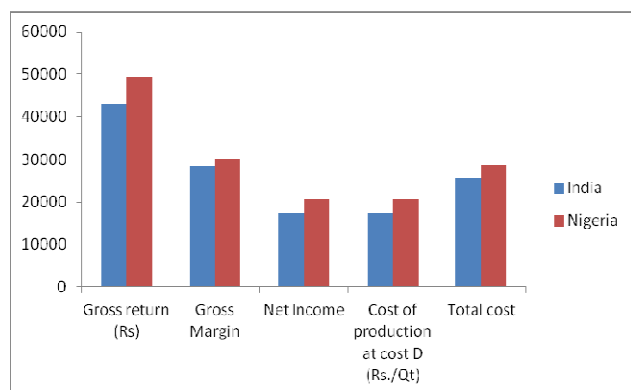
Cost A to D are higher in Nigeria than in India. Cost A<sub>1</sub>, A<sub>2</sub>, B<sub>1</sub>, B<sub>2</sub>, C<sub>1</sub>, C<sub>2</sub>, C<sub>2</sub>\* and D were Rs. 14819.40, 16628.2, 16694, 23294.60, 18906.30, 25294.6 and 25624.1 for India and it was Rs. 19668.8, 20974.8, 21025.80, 26126.10, 23567.5, 28667.80, 26126.10 and 28735.60

#### 4.3. Computation for Cost and Returns Based on CACP for Sorghum Producer in India and Nigeria

Cost of cultivation for India and Nigeria was given in

table 2. The total cost of cultivation i.e. cost D is estimated to be Rs. 25624 and 28738.64 for India and Nigeria respectively. It was evident from the table that the cost A<sub>1</sub> i.e. direct cost involved in sorghum cultivation was Rs. 14819.40 for India and Rs. 19668.78 for Nigeria, and A<sub>2</sub> was Rs. 16628.17 and Rs. 20974.78 for India and Nigeria respectively. In the analysis cost B<sub>1</sub> was Rs. 16694.19 and Rs. 21025.78 for India and Nigeria respectively. Cost B<sub>2</sub> contributed Rs. 23294.55 and Rs. 26126.08 for India and Nigeria respectively. Cost C<sub>1</sub>, C<sub>2</sub> and C<sub>2</sub>\* was Rs. 18906.30, Rs. 25506.66 and Rs.

23624.05 for India and for Nigeria was Rs. 23567.54, Rs. 2866.76 and Rs. 26126.08 respectively. Analysis of return in India and Nigeria cultivation is also presented in table 2. It could be seen from the table, that the average yield of India was found to be 17.68 qtls and in Nigeria 18.14 qtls/ha. The gross income from India was calculated to be Rs. 42978.30 and from Nigeria it was found to be Rs. 49380.10/ha. Therefore, it can be inferred from the table that the farmers got Rs. 6401.8/ha more in case of Nigeria than from the India sorghum cultivation. The net return over direct cost i.e. cost A1 for India was found to be Rs. 28158.00 and for Nigeria was Rs. 29711.22, the net return over Cost A2 was Rs. 26350.13 and 28405.22 for India and Nigeria respectively to the net return. Net return over cost B1 and B2 was Rs. 26284.11, Rs. 19683.75 for India and Rs. 28354.22, Rs. 23253.99 for Nigeria. Net return over cost C1, C2 and C2\* were Rs. 24072.00, Rs. 17471.64 and 19683.75 for India and Rs. 25812.46, 20712.24 and Rs. 23253.96 for Nigeria respectively. The overall net return from India was found to be Rs. 17359.24 and for Nigeria it was Rs. 20641.36 so there was a difference of Rs. 3282.12. The average outputs of the respondents 17.68 qtls and in Nigeria 18.14 qtls per hectare for India and Nigeria sorghum production systems respectively. Also, the revenue generated was Rs. 17354.30 and Rs. 20642.10 per hectare for India and Nigeria sorghum production respectively. The table reveals that India sorghum production had gross margin and net farm income of Rs. 28281.90 and 17354.30 per hectare respectively while Nigeria sorghum producer had gross margin and net farm income of Rs. 29810.00 and Rs. 20642.10 per hectare respectively. The study therefore revealed that, the business of cultivating sorghum in Nigeria is more than that of India



**Fig. 4.** Comparison of cost and income in Sorghum production in India and Nigeria.

## 5. Conclusion

The gross return, gross margin, net income, cost of production at cost D and total cost are higher in Nigeria than

India. It was Rs. 42978.3, 28281.90, 17354.30, 17354.3 and 25624.05 for India while it was Rs. 49380.10, 29810.10, 20642.10, 20642.10 and 28738.64 for Nigeria respectively. The profit is more in Nigeria than India but their cost benefit ratio is the same which shows that their benefit is the same.

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